

REMARKS

Claims 1-2 and 4-8 are pending in the present application, of which claim 8 has been withdrawn pursuant to 35 USC 121. Claim 3 has been cancelled without prejudice of disclaimer thereto.

Claim 1 has been amended to recite the language of claim 3. The claim has also been amended to make clear that the side-chain comprises at least one of either an acrylate unit or methacrylate unit. Claims 4 and 6 have been amended to be consistent with independent claim 1. Due to the nature of these amendments, it is respectfully submitted that no new matter has been added to the application.

Claim Objections

Claims 1, 4, and 6 were objected to because of allegedly using improper Markush group language. The rejection is traversed and it is respectfully submitted that one of ordinary skill in the art would have no difficulty understanding the meets and bounds of the claimed subject matter. However, to expedite prosecution of the application, Applicant has amended claims 1, 4, and 6 to make clear that only one of the recited two elements are required in the claim. Accordingly, reconsideration and withdrawal of the rejection are respectfully solicited.

Rejection Under 35 USC 102

Claims 1, 2, and 4-6 were reject under 35 USC 102(b) as being anticipated by Amano (JP 11-053936). The rejection is traversed and it is respectfully submitted that claims 1-2, and 4-7 are patentable with the meaning of 35 USC 102.

Independent claim 1 relates to a lithium polymer battery, which includes a positive electrode, a negative electrode and a separator. The separator is defined as comprising a liquid organic electrolyte and a host polymer retaining the electrolyte. The host polymer is a cross-linked polymer, which has a main chain comprising vinylidene fluoride unit and a side-chain which is composed of polyethylene glycol diacrylate or polyethylene glycol dimethacrylate wherein said diacrylate or dimethacrylate has an average molecular weight of 300-1600. Dependent claims 2, and 4-7 further define aspects of the battery.

Amano teaches polymer electrolyte and secondary batteries using the electrolyte. Amano also describes a polyvinylidene-fluoride compound with a side-chain as the matrix molecule of the gel polyelectrolyte. Amano discloses a list of potential side-chain compounds that can be introduced to the polyvinylidene-fluoride compound by electron beam irradiation. (See paragraphs 13-15.) Amano, however, does not teach, or suggest a polyethylene glycol diacrylate or polyethylene glycol dimethacrylate side-chain having an average molecular weight of 300-1600. In fact, Amano does not provide any guidance whatsoever with respect to the molecular weight of the side-chain.

In contrast, Applicant has shown, through experimentation in the specification, that the range of 300-1600 average molecular weight is critical to the performance of the host polymer comprising the separator. For example, Applicant discloses the criticality of this range on page 3, beginning at line 9. Applicant also provides experimental results in Table 1 at page 26 of the specification. Therein, it can be seen that a side-chain having a molecular weight falling outside of the 300-1600 molecular weight does not have the capacitive maintenance rate of a host polymer having a side-chain within the claimed range. (Compare Examples 1-6 to Examples 11 and 12 in Table 1.) Applicant discusses these results at page 28, second full paragraph of the

specification. Therein, Applicant discloses that the size of the side-chain effects the storage characteristics of the polymer battery at high temperatures. In particular, Applicant discloses that when the side-chain is too short, the function of retarding the liquid organic electrolyte is insufficient and when the side-chain is too long, the property of the ethylene oxide unit tended to decompose.

It is respectfully submitted that these results would not be expected by one of ordinary skill in the art and would not have been recognized by one of ordinary skill in the art without the benefit of the present disclosure. Accordingly, Applicant respectfully submits that any prima facie case of obvious that may have been established by the cited reference is amply rebutted by the data in the specification for the now claimed subject matter. Accordingly, reconsideration and withdrawal of the rejection are respectfully solicited.

Claims 1, 3, and 7 were rejected under 35 USC 102(b) as being anticipated by Takadera (JP 11-035765). The rejection is traversed and it is respectfully submitted that the claims now in the application are patentable within the meaning of 35 USC 102(b).

As discussed above, independent claim 1 now recites a separator including a host polymer which has a side chain composed of polyethylene glycol diacrylate or polyethylene glycol dimethacrylate, wherein the side-chain has an average molecular weight of 300-1600.

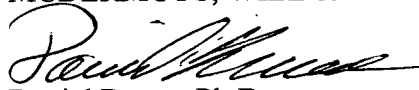
Takadera, in contrast, teaches a blend or a mixture of a fluoropolymer and an ether polymer. There is no teaching or suggestion in Takadera of a polymer comprising a polyalkylene glycol side-chain, let alone the separator as recited in independent claim 1. For this reason alone, it is respectfully submitted that Takadera does not anticipate the now claimed subject matter. Reconsideration and withdrawal of the rejection are respectfully solicited.

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To the extent necessary, a petition for an extension of time under 37 C.F.R. 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account 500417 and please credit any excess fees to such deposit account.

Respectfully submitted,

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